

WHAT IS CLAIMED IS:

1. A method of at least partially compensating for an x-ray tube target angle heel effect, said method comprising:

providing an x-ray source;

providing an x-ray detector having a plurality of detector rows positioned to receive x-rays from the source; and

using a filter to increase uniformity of at least one of a projection noise and a spatial resolution, wherein the projection noise and the spatial resolution are non-uniform and are a function of a target angle along a z-axis.

2. A method in accordance with Claim 1, wherein said using a filter comprises filtering different detector rows differently based on detector row number.

3. A method in accordance with Claim 1, wherein said using a filter comprises using a filter to increase uniformity of the spatial resolution where the filter $f(z)$ is determined according to $t(z) = s(z) \otimes f(z)$, wherein $t(z)$ is a target spatial resolution function, and $s(z) = h(z) \otimes d(z)$, wherein $h(z)$ is a projected focal spot function and $d(z)$ is a projected detector aperture function.

4. A method in accordance with Claim 1, wherein said using a filter comprises using a filter to increase uniformity of the projection noise such that

$$w_{k-}^2 + w_k^2 + w_{k+}^2 = \eta_k$$

wherein w_{k-} , w_k , w_{k+} denote a filter coefficients for detector rows k-1, k, and k+1; and

wherein η_k is a normalized projection noise level for detector row k.

5. A method in accordance with Claim 1 wherein said using a filter further comprises using a filter configured to increase uniformity of the spatial resolution when the target angle is smaller than the center detector row and increase

uniformity of the projection noise when the target angle is larger than a center detector row.

6. A method in accordance with Claim 5 wherein said using a filter further comprises using a filter configured to increase uniformity of the spatial resolution when a target angle is smaller than the center detector row, wherein the filter $f(z)$ is determined according to $t(z) = s(z) \otimes f(z)$, wherein $t(z)$ is a target spatial resolution function, and $s(z) = h(z) \otimes d(z)$, wherein $h(z)$ is a projected focal spot function and $d(z)$ is a projected detector aperture function.

7. A method in accordance with Claim 6 wherein said using a filter further comprises using a filter configured to increase uniformity of the projection noise when a target angle is larger than a center detector row such that

$$w_{k-}^2 + w_k^2 + w_{k+}^2 = \eta_k$$

wherein w_{k-} , w_k , w_{k+} denote a filter coefficients for detector rows $k-1$, k , and $k+1$; and

wherein η_k is a normalized projection noise level for detector row k .

8. An imaging system for scanning an object comprising:

an x-ray source;

an x-ray detector having a plurality of detector rows positioned to receive x-rays from said source;

a computer operationally coupled to said x-ray source and said x-ray detector; and

a filter positioned between said x-ray source and said x-ray detector, said filter comprising a non-stationary filter, wherein said non-stationary filter is configured to filter different detector rows differently based on detector row number.

9. An imaging system for scanning an object comprising:

an x-ray source;

an x-ray detector having a plurality of detector rows positioned to receive x-rays from said source;

a computer operationally coupled to said x-ray source and said x-ray detector, wherein said computer is configured to filter at least one of a projection noise and a spatial resolution to increase uniformity, wherein said projection noise and said spatial resolution are non-uniform and are a function of target angle along a z-axis.

10. A system in accordance with Claim 9, wherein said filter is configured to increase uniformity of said spatial resolution where the filter $f(z)$ is determined according to $t(z) = s(z) \otimes f(z)$, wherein $t(z)$ is a target spatial resolution function, and $s(z) = h(z) \otimes d(z)$, wherein $h(z)$ is a projected focal spot function and $d(z)$ is a projected detector aperture function.

11. A system in accordance with Claim 9, wherein said filter is configured to increase uniformity of said projection noise such that

$$w_{k-}^2 + w_k^2 + w_{k+}^2 = \eta_k$$

wherein w_{k-} , w_k , w_{k+} denote a filter coefficients for detector rows k-1, k, and k+1; and

wherein η_k is a normalized projection noise level for detector row k.

12. A system in accordance with Claim 9 wherein said filter is further configured to increase uniformity of said spatial resolution when a target angle is smaller than a center detector row and increase uniformity of said projection noise when the target angle is larger than the center detector row.

13. A system in accordance with Claim 12 wherein said filter is further configured to increase uniformity of said spatial resolution when the target angle is smaller than the center detector row, wherein the filter $f(z)$ is determined according to

$t(z) = s(z) \otimes f(z)$, wherein $t(z)$ is a target spatial resolution function, and $s(z) = h(z) \otimes d(z)$, wherein $h(z)$ is a projected focal spot function and $d(z)$ is a projected detector aperture function.

14. A system in accordance with Claim 12 wherein said filter is further configured to increase uniformity of said projection noise when the target angle is larger than the center detector row according to

$$w_{k-}^2 + w_k^2 + w_{k+}^2 = \eta_k$$

wherein w_{k-} , w_k , w_{k+} denote a filter coefficients for detector rows $k-1$, k , and $k+1$; and

wherein η_k is a normalized projection noise level for detector row k .

15. A computer readable medium encoded with a program executable by a system for at least partially compensating for an x-ray tube target angle heel effect, said program configured to instruct the computer to:

provide an x-ray source;

provide an x-ray detector having a plurality of detector rows positioned to receive x-rays from the source; and

use a filter to increase uniformity of at least one of a projection noise and a spatial resolution, wherein the projection noise and the spatial resolution are non-uniform and are a function of target angle along a z-axis.

16. A computer readable medium in accordance with Claim 15, wherein to use a filter comprises using said filter to increase uniformity of the spatial resolution where the filter $f(z)$ is determined according to $t(z) = s(z) \otimes f(z)$, wherein $t(z)$ is a target spatial resolution function, and $s(z) = h(z) \otimes d(z)$, wherein $h(z)$ is a projected focal spot function and $d(z)$ is a projected detector aperture function.

17. A computer readable medium in accordance with Claim 15, wherein to use a filter comprises using said filter to increase uniformity of the projection noise according to

$$w_{k-}^2 + w_k^2 + w_{k+}^2 = \eta_k$$

wherein w_{k-} , w_k , w_{k+} denote a filter coefficients for detector rows k-1, k, and k+1; and

wherein η_k is a normalized projection noise level for detector row k.

18. A computer readable medium in accordance with Claim 15 wherein said to use a filter further comprises using said filter configured to increase uniformity of the spatial resolution when the target angle is smaller than the center detector row and increase uniformity of the projection noise when the target angle is larger than a center detector row.

19. A computer readable medium in accordance with Claim 18 wherein said to use a filter further comprises using said filter configured to increase uniformity of the spatial resolution when a target angle is smaller than the center detector row, wherein the filter $f(z)$ is determined according to $t(z) = s(z) \otimes f(z)$, wherein $t(z)$ is a target spatial resolution function, and $s(z) = h(z) \otimes d(z)$, wherein $h(z)$ is a projected focal spot function and $d(z)$ is a projected detector aperture function.

20. A computer readable medium in accordance with Claim 19 wherein said to use a filter further comprises using said filter configured to increase uniformity of the projection noise when a target angle is larger than a center detector row such that

$$w_{k-}^2 + w_k^2 + w_{k+}^2 = \eta_k$$

wherein w_{k-} , w_k , w_{k+} denote a filter coefficients for detector rows k-1, k, and k+1; and

wherein η_k is a normalized projection noise level for detector row k .